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ABSTRACT

The purpose of this study was to evaluate the effects and the effectiveness of the use of an on-line community to support preservice teacher and new teacher interaction and development. Mathematics, Science, and Technology (MaSTech) was designed to connect middle grade mathematics preservice teachers and beginning teachers with their peers as well as with university education supervisors and two graduate students who are master teachers in teaching mathematics. MaSTech aimed to provide a forum for peer-mediated learning and to promote effective problem-solving among preservice teachers and beginning teachers. Participants in MaSTech found the use of the on-line forum to be a profitable and enjoyable experience. (Contains 13 references.) (ASK)

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MaSTech: Mathematics, Science, and Technology

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Purpose

The purpose of this study was to evaluate the effects and the effectiveness of the use of an on-line community to support preservice teacher and new teacher interaction and development. *MaSTech* was designed to connect middle grades mathematics preservice teachers and beginning teachers with their peers as well as with university education supervisors and two graduates students who are master teachers in teaching mathematics. The purpose of the *MaSTech* was to provide a forum for peer-mediated learning and to promote effective problem-solving among preservice teachers and beginning teachers. Both Caplan's theory of collaborative consultation (Caplan, Caplan, & Erchul, 1995) and the related concept of peer-meditated learning (Zins, 1996) provided the conceptual framework for on-line problem-solving discussions.

Collaborative consultation has been found to improve teachers' problem-solving skills, facilitate teachers' understanding of and attitude toward children's problems, and promote gains in long-term academic achievement (Meyers, 1995). The main objective of collaborative consultation is to improve the teacher's capacity to deal with issues presented, not only for the current problem, but also for future similar problems (Caplan & Caplan, 1993). The absence of a collaborative problem-solving dialogue among teachers may contribute to teacher isolation and inhibit their ability to implement changes in their classrooms (Johnson & Pugach, 1996). The on-line support community is an excellent avenue for promoting collaborative problem-solving among new teachers through peer-mediated learning (Zins, 1996). The goals of the peer-mediated learning approach are to promote "more diverse and creative ideas for problem solving" and to increase moral and emotional support (Zins, 1996, p.6). This study will extend the investigation of such a process to include preservice teachers.

Design of study

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Participants in *MaSTech* Project included 7 preservice teachers, 4 first-year beginning teachers, 2 master teachers, and 4 faculty members from the School of Education at the University of North Carolina-Chapel Hill (UNC-CH). The preservice teachers were in their last semester of the middle grades teacher education program at UNC-CH. The beginning teachers were graduates of the middle grades teacher education program at UNC-CH and were teaching in 4 public schools dispersed across North Carolina. The master teachers were graduate students in the UNC-CH Curriculum and Instruction Doctoral Program; they were accomplished practitioners who had extensive experience in working with novice teachers. The 4 faculty were the supervisors of the preservice teachers; one was also project director of MaSTech. All participants were invited to be involved in this project; all agreed to participate in the on-line forum (See Tables 1, and 2). For the preservice teachers, this activity took the place of required weekly journaling assignments.

[Insert Tables 1 & 2 here]

Participation included attending a whole-day training session in the use of the discussion forum and two follow-up sessions throughout the semester (tape-recorded), posting issues and concerns to the group, and responding to issues presented on-line. The responses on-line were organized and kept (1) as a resource for discussion throughout the semester and (2) as a resource for analysis and identification of issues and discussion themes for research purposes at the end of the semester. The faculty supervisors and two graduates students who are master teachers served as "telementors" to the preservice teachers and beginning teachers. In addition, six of the interns and three beginning teachers were interviewed in March, 1998; all participants responded to an end-of-forum reaction sheet in May, 1998. All participants were reasonably well-versed in using technology for electronic communication; each participant was given a laptop computer and an internet account to use for the four months of the project. A threaded, World Wide Web-based asynchronous discussion forum implemented in Lotus Notes was used; access was password protected to insure confidentiality.

Selected Preliminary Results

> "Mainly, it [the discussion forum] was a tool for survival in the crazy & spontaneous world of teaching. If something arose that I couldn't handle or thought I could have handled differently, I talked about it on the forum. Most of the time feedback was given that I could either immediately use or could use later." (Preservice teacher)

We begin with a more generic descriptive analysis of messages posted to the *MaSTech* forum. Blanton, Moorman, and Trahen (1998) report that most of the studies they reviewed that focused on telecommunications in undergraduate and graduate education courses contained descriptive analyses of the messages. These analyses involve such things counts of messages, identification of themes, length of messages, and so on.

Table [3] shows the total number of messages and the breakdown among categories of participants. One of the seven preservice teachers (19 messages), while comfortable with using technology, avoided using the forum, noting that she could not find the time to participate (i.e., get the laptop set up and hooked to a phone line and call in). The four beginning teachers varied in responses (27, 39, 62, 86); one was overwhelmed in having to teach a content area in which she had not done her student teaching. The beginning teachers did not have the requirement of participating three times a week, as did the preservice teachers, but they were encouraged to do so if possible. Of the four supervisors, two had 25 or 29 messages, choosing to communicate in other ways; one became enthralled with the on-line communication and was quite active with 88 messages. The final supervisor (118 messages) was the project director and designated "facilitator." The majority of the 76 messages from one of the master teachers were summaries of discussion topics posted when discussions had been concluded.

[Insert Table 3 here]

Rather than analyze at the message level, we chose to analyze messages at the topic level in a manner similar to that found in DeWert, Babinski, and Jones (in press). Messages were grouped into "discussions;" a discussion was defined as a topic and the related responses it generated. There were 193 topics introduced for discussion. Preservice teachers initiated 67% of the topics,

beginning teachers initiated 21% of the topics, supervisors initiated 8% of the topics, and master teachers initiated 6% of the topics. Of the 193 topics, 69% generated 0-4 responses; 23% generated 5-9 responses, and 8% generated 10 or more responses. Preservice teachers, in using this participation to "substitute" for their journal-writing requirements associated with student teaching, were expected to participate at least three times weekly over the course of their student teaching (January - April). They appear to have defined participation, in part, as introducing new topics for discussion. This may account for the number of topics that were introduced and the number of discussions that involved four or less responses.

In seeking to determine appropriate categories, we drew from an earlier project (DeWert, Babinski, & Jones, in press) that provided a year-long computer-mediated support community for beginning teachers (elementary and middle grades teaching a variety of subjects). *MaSTech* was different in that it focused on content-specific teaching (i.e., mathematics and science) being done at the middle grades level (grades 6-8) and sought to promote interaction among preservice and beginning teachers. Based on these modifications, we adapted the categories developed by DeWert, et al. (in press); initial categories used were:

- *Curriculum and Instruction* included discussions of the content of mathematics/science, pedagogy as it relates to teaching this content, and understanding what students learn about this content.
- *Individual students* included discussions about behavior and/or learning of single or small groups of students.
- *Classroom management* discussions generally addressed issues related to managing an entire class; these issues did not involve content as a component of the management discussion.
- *Evolving professional* involved discussions that focused attention on participants' growth and knowledge as a professional.

- *Interaction with colleagues and parents* involved discussions about parent conferences and other interactions with parents, working in a team of teachers, and working with such professionals as cooperating teachers, substitutes, and other school personnel.
- *Community bulletin board* included topics that involved general communication about the project, personal information about the participants, or stories or reflective problem solving about teaching.

We grouped the 193 resulting discussions into these six categories; Table 4 summarizes this information. Also included are four examples of the discussions categorized under the heading of *Curriculum and Instruction* (Figures 1, 2, 3, and 4).

[Insert Table 4 and Figures 1 -4 here]

When the discussion forum was begun, it was intended that it serve both preservice and beginning teachers. As it evolved, preservice teachers and their involvement in their field placement quickly appeared to become the central focus. It afforded a rich perspective by the very nature of the viewpoints brought by the main participants, that is, preservice teachers, beginning teachers in their second half of their first year of teaching, a clinical teacher who was on leave to work with the middle grades faculty for the year, and university supervisors. Table 5 provides some insights into what value the preservice and beginning teachers felt they obtained from their participation in the forum. From the sample of comments presented, it is clear that the beginning teachers did see their participation as helpful to their own needs in addition to their contributions to the work of the preservice teachers. In particular, it is interesting to note that the beginning teachers experienced the continued connection as a form of extended "student teaching," acknowledging the benefits of having faculty who "knew" them still involved in their professional lives.

[Insert Table 5 about here]

<u>The nature of conversation in an on-line forum</u>

> I feel like sometimes a discussion topic will be brought up and then there might be one or two responses to it and then that's it. ... I think that when somebody takes the effort and

> energy and time to write this discussion topic, its obviously important to them and then they get 2 responses to it... (Preservice teacher)

If we want to move ahead on the implementation of on-line discussion forums as a way to support preservice and practicing teachers, we need to better understand how to best use such a tool. In this section, we discuss the nature of conversation as it occurs on-line and raise a number of issues to consider.

The opening quote highlights the issue of how discussion topics get raised and what needs to be considered in responding to these messages. The number of messages written necessitated that one keep up-to-date on reading the forum information; it was difficult to get caught up if one "fell behind." In addition to reading the messages, participants had to make decisions about which messages they would respond to and what they wanted to say. When asked, some participants indicated that they read only some of the messages and responses; other said that they read all the material. The question of being "responded to" is very important; involvement does depend on being acknowledged as participant in the forum. On-line, this happens by others taking time to respond to your messages. Generally, the participants felt that their messages were being read and responded to, but there were those occasions when few or no responses were forthcoming that would raise concerns.

> The only time I feel as if my responses aren't being read are when I write a discussion topic and no one or only one or two people respond. It makes me feel a little disappointed because what I write about is important to me.

Of course, there are reasons for limited responses. For example,

> Sometimes I don't respond to every new topic because I read what you wrote or someone else wrote and it would be pretty much the same thing.

In a few instances, participants acknowledged that they didn't know how to respond. For example, in one message, the writer discussed a situation that involved very sensitive issues to which other preservice and inservice teachers felt unable to respond. It may also be the case that a message is "shallow" and simply doesn't provoke much engagement. Yet some messages

(Figure 2) excite participants and are ones that they choose to respond to no matter who else has responded. It also may be that the potential for rich discussion exists for some subset of the messages initiated but, for some reason, such discussion does not develop.

When asked what about a topic or a response to a topic engaged them, participants gave two main answers: they felt that they had related personal experiences and/or believed that they had some concrete advice to offer. Most often, participants chose not to respond if they felt that they didn't have anything to say or had not had a related experience that "qualified" them to be able to give advice or if they felt they didn't have something new or different to contribute to what had already been said.

As DeWert, et al. (in press) note, most on-line communities of practice have been "unstructured," that is, topics are initiated and discussed among the participants with little mediation by others. In this forum, the preservice and beginning teachers were viewed by the other participants (i.e., supervisors and master teachers) as the people for whom the forum was intended. As previous discussion indicates, the structure of on-line communications seems to be an important factor in supporting productive discourse and group problem solving among participants. The actual level of "control" is a delicate balance; neither inhibitions to free exchange or free-flowing, unfocused exchanges are desirable; the goal is to have professional, task-oriented exchanges. Such structuring of on-line communications is helped with the presence of an on-line facilitator. The literature suggests that a facilitator may be key to developing and maintaining a discussion group. A variety of effective strategies have been identified (e.g., Ahern, Peck, & Laycock, 1992; Berge, 1996; Pattison-Gordon, 1997; Zorfass, Remz, Gold, Ethier, & Corley, 1998) for effective facilitation; those considered most relevant here include:

- providing leading questions, asking for clarification, and probing with questions
- contributing to the discussions
- making sure participants receive timely responses to their postings
- pointing out questions or issues that haven't been responded to

- showing how one person's ideas connect to other's ideas to help construct group understanding
- commenting on group progress and processes
- summarizing and synthesizing postings to draw together main themes

In MaSTech, one of the supervisors served as the on-line facilitator. In this instance, facilitating involved a decision to support but not direct the forum and to make sure participants received timely responses to their messages as needed, particularly those messages that may not be responded to as easily (e.g., the earlier-noted message to which most participants felt unable to respond). Beyond this, the facilitator chose to let participants direct the conversations throughout the forum. As the forum progressed, both the facilitator and the supervisors sought to initiate topics that would provoke both substantive and several responses (see Figure 3 for one example). As one supervisor noted, when people started always agreeing with each other and not saying anything challenging, she wanted to become the devil's advocate by provoking dissonance! In part, the "hands-off" nature of the facilitation possibly permitted the initiation of a large number of topics for discussion without the associated generation of numbers of responses. Of course, some initiated topics generated a large number of responses; clearly, there were themes that were relevant being introduced by the preservice and beginning teachers. Examples of these "high profile topics" include the discussions shown in Figures 1 and 2, as well as discussion topics on getting students' attention, how to motivate students' to complete homework, calling a parent, what happens for gifted students (initiated by a supervisor), becoming part of the team, using the discipline strategy of writing students' names on the board, initiating activities in teaching mathematics, slow test takers, and fear of failure in doing mathematics (initiated by the "devil's advocate" supervisor), grading, and a few serious social dilemmas that occurred in the schools (e.g., there was a suicide at a middle school where one preservice teacher was placed).

It does seem that there may be plateaus that occur in sustaining interest in discussion on-line. *MaSTech* occurred over a period of about 3 months. Anecdotal evidence from other on-line discussion projects occurring at UNC-CH indicates that 3 months may be a benchmark, that is, at that point free-flowing discussion looses some of its shine, and there appears to be a need for some thoughtful facilitation. Intervention may be subtle, involving more conscious attention to the points that described actions of a facilitator as presented earlier. For example, one form of intervention that took place in *MaSTech* resulted from classroom visits to some of the preservice and beginning teachers by the facilitator; following these observations, the facilitator encouraged the teachers to share their stories on-line. Another form of intervention involved the facilitator seeking to connect earlier learning experiences with present work in the field (Figure 3). On the other hand, a forum may be organized to include a component of structure from the beginning so that, in addition to the more free-flowing conversations, a planned conversation also is ongoing. In the case of DeWert (in press; DeWert, et al., in press), their discussion forum involved a reflective problem-solving process that was part of the interactions from the very beginning. This problem-solving process involved:

1) a teacher presenting a practice-based concern or problem

2) the group helping the teacher define and represent the problem by viewing the problem from multiple perspectives, reframing the problem if necessary, and generating hypotheses about why the problem occurred,

3) the group helping the teacher generate possible strategies or solutions to address the problem,

4) the group assisting the teacher in developing a plan of action, and

5) the teacher implementing the plan of action and providing follow-up reports to the group on the implementation of the plan.

One way to structure such participation is to assign two-week blocks to each participant; during an assigned block of time, the participant is responsible for introducing the problem

and for managing the discussion. At the same time, other discussion topics are ongoing and are introduced and responded to by all participants.

In addition to facilitating a forum, the content of the forum may be difficult to write about. It is not always easy to express what you want on-line. This is particularly true when you want to talk about mathematics.

> When I wrote up my graphing calculator lesson, its hard...like I know what I wanted to say ... but typing it...its hard to express in words sometimes what happened or what I wanted to happen. I got really frustrated when I was writing that 'cause I'd say this is how happened but how do I tell it without taking a book. ... So that's why I ended it with saying...okay...if you've have questions, just ask me. (Preservice teacher)

Looking at Figures 1 and 3, we see two examples where a discussion was initiated about mathematics and teaching mathematics. Clearly, in both instances, we do gain a great deal from the discussions, but what is missing? What else would we like to be able to address that is not being addressed? Do we want to be able to share student work? Would having scanners that could be used to make both teacher work and student work available to the other participants help? Possibly an interactive chat room that was "open" at certain hours would be helpful when teachers want to talk about mathematics content and ways to teach? Perhaps it would be better if all the participants were "doing the same mathematics" at the same time so they would be able to share experiences about pedagogy and student thinking?

Finally, it should be noted that a number of preservice and beginning teachers commented as various times, both on-line and in self-reports, that they felt that participation in the forum made them more reflective about teaching (see Figures 3 and 4 for examples which were *not* typical of all participants). It is interesting to note that two of the supervisors also worked with preservice teachers who were not participating in the discussion forum. From their perspective, both the quality and depth of reflection through journaling with these preservice teachers was substantially different than what occurred during the on-line forum. Their observations were that in the individual, one-on-one interactions they had with preservice teachers not involved with

MaSTech, the was greater depth and thoughtfulness demonstrated in self-reflective comments. Is this a result of the ways thoughts are shared in an on-line forum? Or is it possible, through greater structure and more proactive facilitation to deepen the level of reflection demonstrated through conversations on-line?

Conclusion

There is little doubt that the participants in *MaSTech* found the use of the on-line forum to be a profitable and enjoyable experience. The supervisors agreed that such participation did support and enhance the objectives of the student teaching experience. At the end of the project, all participants wanted the forum to continue. Indeed, if the technology and ready access to internet had been available fall 1998, we would be continuing with *MaSTech*.

On-line discussion forums have the potential to provide professional development and support in different and interesting ways. What appear to be a very important issues to address involve the nature of the facilitation, the ways to structure a forum in order to promote reflection, and how to address talking about teaching mathematics as a discipline. This paper sought to provide some insights into these issues as part of its report about the *MaSTech* forum.

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Table 1: Age, sex, and number of participants

	Age Range	Females/Males	Number
preservice and beginning teachers	19 -23	10/1	11
master teachers	25-30	2/0	2
university supervisors	40-52	4/0	4

Table 2: Characteristics of participants

Participant	Subjects/Grade level/Area Specialty
Preservice Teacher #1	Mathematics, grade 7
Preservice Teacher #2	Science, grade 6
Preservice Teacher #3	Science and mathematics, grade 8
Preservice Teacher #4	Mathematics, grade 6
Preservice Teacher #5	Science and mathematics, grade 8
Preservice Teacher #6	Mathematics, grade 7
Preservice Teacher #7	Science and mathematics, grade 7
Beginning Teacher #1	Language arts and mathematics, grade 7
Beginning Teacher #2	Science and mathematics, grade 8
Beginning Teacher #3	Mathematics; grade 7
Beginning Teacher #4	Mathematics; grade 7
Supervisor #1	Special education; gifted education
Supervisor #2	Mathematics education
Supervisor #3	Clinical teacher; language arts
Supervisor #4	Language arts
Master Teacher #1	Middle grades mathematics
Master Teacher #2	Elementary grades mathematics

Table 3: Total Messages from January 10 - May 1, 1998

Participants	Number of Messages	Percent of Total Messages	Range
Preservice Teachers	424	43%	19 - 87 messages
Beginning Teachers	214	22%	27 - 86 messages
Supervisors	257	26%	25-118 messages
Master Teachers	84	9%	8, 76 messages
TOTALS	979	100%	8 - 118 messages

Table 4: Categories of Messages

Category	Number of Discussions (Topics)	Percent of Total Discussions (Topics)
Curriculum and Instruction	61	32%
Individual students	19	10%
Class managment	18	9%
Interaction with colleagues and parents	10	5%
Evolving as a professional	31	16%
Community bulletin board	54	28%
TOTALS	193	100%

Figure 1: Measuring angles

Measuring Angles (1)
. . Re: Measuring Angles (2)
. . Re: Measuring Angles (3)
. . . . Re: Measuring Angles (4)
. . Re: Measuring Angles (5)
. . . . Re: Measuring Angles (6)
. . Re: Measuring Angles (7)
. . Re: Measuring Angles (8)
. . Re: Measuring Angles (9)
. . Re: Measuring Angles (10)
. . Re: Measuring Angles (11)
[Next Main Topic]

1/15/98 - 11:46 p.m. (1) Okay, I need some suggestions from those of you who really enjoy teaching geometry, especially the topic of measuring angles. I am in a low level math class that for the past couple of days has been learning to use a protractor to measure angles. I notice that many students are having problems reading the correct numbers on their protractors. For example, students were measuring an angle and they were suppose to figure out that it was a 50 degree angle. When walking around the room I noticed that many students had written down that the angle measure was 130 degrees. I realized that what they were doing was reading the numbers wrong on their protractors. There are two sets of numbers on the protractors. On each side (left and right) of the protractor the numbers start with 180 and 0 degrees. There are a set of little numbers directly below the set of big numbers. These two sets of numbers going different ways on the protractor are really confusing some of the studnets. So when some studnets were suppose to be reading the angle as 50 degrees they were really reading it as 150 degrees. They were suppose to be reading the smaller set of numbers, but because they could see the larger set more clearly they were reading those numbers instead. They had the right idea but weren't able to figure out exactly which set of numbers they were suppose to read. Students new that they were to begin counting the measure of the angle at the "zero line." I tried to explain to those students who were having trouble that if they were to measure the angle from the "zero line" then they should always begin measuring their angle from the number 0, whether or not they are measuring an angle using the numbers on either side (left or right) of the angle. HOwever, some studnets could use this tactic for figuring out the angle while I was standing over them and watching. As soon as I left they would begin another problem and end up doing the same thing they had done in the first place. Does anyone have any suggestions for how I might help these students

remember and understand how to measure angles correctly every time? Help, (Preservice teacher #3)

1/16/98 - 12:24 p.m. (2) One thing I wonder is could each student actually mark his protractor (with permanent pen) the spot from which to start measuring? Also, since students seem to forget how after you leave, could you train and strategically place/scatter certain student "coaches" who do understand this? - (Supervisor #3)

1/16/98 - 8:26 p.m. (3) I do not know if this is a solution you are looking for, but since these kids are in lower level math and are just beginning to work with protractors, maybe you could tell them to ONLY use the small numbers or only use the big numbers. Then, you could use (Supervisor #3)'s idea of marking the spot from where they should start measuring all the time. After they get the hang of this, if you feel it necessary, you could allow them to use the other numbers on the protractor. (You could even mark off the larger numbers with tape or something) Also, I don't know how much they know about acute, obese, and right angles and what they look like, but you could always encourage them to check the answer they got with the way the angle looks. If the angle is wide, and they get 30 degrees, then a little alarm should go off saying that the measure they got was too small for how wide the angle is and so they must have used the protractor incorrectly. I don't know if this will help, but I thought I would give some suggestions. Good luck!
(Preservice teacher #1)

1/16/98 - 10:12 p.m. (4) I liked (Preservice teacher #1)'s and (Supervisor #3)'s suggestions. Also, if you want , I have a tool called an angle rule that does a full 360 rotation for measuring angles. I have a classroom set. It might be the way to begin...and then go to protractors. If you want to borrow them, let me know. I'm in on Monday at 1:00 p.m. to see Lori W. about her unit. You could get them then if you want. (Supervisor #2)

1/16/98 - 9:27 p.m. (5) Teaching them to use a bit of common sense, then, to recognize angles appearing larger than a right will naturally be a number higher than 90 (and smaller equals less than 90) should help. In other words, teach them to ask, "Does my answer make sense in light of what I know about a right triangle?" (Supervisor #3)

1/16/98 - 10:15 p.m. (6) Just thought of another idea...feeding off (Preservice teacher #1) and (Supervisor #3) again. You could take something like the tangram pieces or the pattern blocks. They all have 90 degree angles on some of the pieces. Then ask kids to see if they can figure out the other angles based on what they know about the 90 degree angle. They're basically dealing

with 45 and 30 degree angles. This would actually promote the notion of benchmarks and building a frame of reference for their work. I like that idea ... thanks (Preservice teacher #1) and (Supervisor #3). (Note...again, I've got the tangrams or pattern blocks if you need them) (Supervisor #2)

1/17/98 - 1:42 p.m. (7) Hey! I'm not sure about reading the numbers off of the protractor but you could bring up the idea of whether or not the angle is obtuse or acute. If they know what these terms mean then they could reason that 150 is too much for an acute angle and so it must be the other number because it is less than 90. I can see how trying to decide which numbers to read could be very confusing. I usually have to think about what kind of angle it is also even when I measure them. I hope this helps. (Preservice teacher #5)

1/17/98 - 1:42 p.m. (8) Hi everyone! I just wanted to apologize for basically repeating what (Preservice teacher #1) and (Supervisor #3) said about the angles. I responded before I read those. Sorry again! But hey, it must have been a good idea!!! (Preservice teacher #5)

1/17/98 - 11 49 p.m. (9) I just wanted to give you an idea about the angle measures. This may no work but it is just a suggestion. It sounds like you first need to make sure the students understand what an obtuse angle and an acute angle look like. Make sure the know the simple idea that an obtuse angle is large while an acute angle is smaller. This is a general idea but you know what I mean. Once they understand how these angles look you might try an activity that requires the students to do a hands on activity. In my class, the studetns had to find different items outside that had certain angle measures provided by the teacher. On a piece of paper were a list of angle measures. The students were to pick an object or item outside that they thought might have this angle measure. Then they had to measure the angle to see how close they were. When the teacher go the papers back, he could see if the kids actually understood what an acute and obtuse angle looked like. This activity provided the students with a hands-on activity that the class as a whole did outside the classroom. Maybe after an activity like this one students would better understand how to read the protractor. I hope this helps a little. If not sorry!! (Preservice teacher #4)

1/18/98 - 5:34 p.m. (10) I had this same problem with protractors last year. The kids always read the wrong number. The way I tried to solve it was this: I reviewed the concept of the right angle measuring 90 degrees. We looked at pictures around us of what is 90 degrees. Then I challenged the kids to use their heads a little. They knew immediately from looking at an angle whether it was greater or less than 90 degrees. So then figuring out which measurement on the protractor was correct was easy. A lot of times kids are so afraid of math and geometry that they forget that it should make sense. It only makes sense when you look at an obtuse angle, for example, that

its measure would be 150 degrees rather than 30. Good luck - and let me know if you try it.
(Beginning teacher #4)

1/18/98 - 7:21 p.m. (11) I am experiencing the same problem with my low-level kids as well. The only thing that has seemed to work for me is have my kids first label what type of angle they are measuring (ie. obtuse, acute, or right). My students were able to successfully tell me the definitions of these types of angles and even recognize them; however, they were not using their knowledge of what they know about these angles to help them measure them. Instead of having my students just measure the angles, I also had them state the type of angle it was. This helped them recognize what numbers to focus on when using the protractor. Hope this helps.
(Beginning teacher #3)

Figure 2: Warm ups

warm-ups (1)
. . Re: warm-ups (2)
. . . . Re: warm-ups (3)
. . . . Re: warm-ups (4)
. . . . . Re: warm-ups (5)
. . . . . Re: warm-ups (6)
. . Re: warm-ups (7)
. . Re: warm-ups (8)
. . Re: warm-ups (9)
. . . . Re: warm-ups (10)
[Next Main Topic]

2/02/98 - 11:59 p.m. (1) Every day, the students come in class and there is a warm-up problem on the overhead for them to start on. I have found that this is a good way to get the students in the class and seated, though they're not always quiet. But, I think the problems I am using are not worthwhile or motivating. It almost seems like they are a waste of time because the students are given about 5 minutes after the bell rings to work on these problems. Sometimes it takes longer if not many have gotten the answers. The first 2 students who get the correct answer are given pens and go around and check the other students answers as they come up with them. After I feel like a good number have gotten the solution or I feel like they are having too hard a time with it, I go ahead and go over the solution. By now, we have used at least 10 minutes of the class period. Our classes are only 50 minutes to begin with. Can you give suggestions how to make this better, more efficient, and a more valuable experience for the students? (Preservice teacher #6)

2/03/98 - 1:56 p.m. (2) I wonder what the purpose of warm-ups is for each of you? Clearly, its a good strategy to get students focused on work. (1) But what is it that you are seeking to address with the warm-up? Problem solving strategies? Review of skills? Advanced organizer for the day's lesson? End-of-grade practice problem(s)? (2) Further, what are the ways to bring closure to this part of the class? Do you need to "go over" every warm-up? Do you ask students to keep a section of a notebook with their warm-ups and you look at these every so often? Do you have students go around and check others' work? (3) What if some students don't get the warm-up done? Is this okay? Maybe someone wants to talk about a warm up given, goal, and how handled? Or whatever. Seems that it might be valuable to get clearer about the purposes for using warm-ups since many advise new teachers to "do a warm-up" as part of the lesson structure. (Supervisor #2)

2/03/98 - 9:22 p.m. (3) I do a daily warm-up for several reasons. (1) It is a good practice for the end of grade test. I put two problems on the board daily. We go over them as a class after about 4 minutes. The students keep the problems in their notebooks until Friday, when I collect them and make sure they have completed them. (2) This gives me a chance to collect myself and regroup before we begin class. I tell the kids that I need a few minutes to do this as well as take attendance and get organized in general. (Beginning teacher #4)

2/05/98 - 2:45 p.m. (4) We do warm-ups or challenges everyday. Sometimes we have two. A lot of them are from the End of Grade Test. Then, the other ones are just fun problmes that make the studnets think or word problems that require different steps. The only problem is that these problems sometimes take over half the period, even when my clinical teachers is in charge. I would love some suggestions on some problems that are quick but provide a challenge and entertain the studetns. The students know when they come in they need to get their notebooks out and begin the challenge. IF you know of a book with short, fun challenging problems, let me know. (Preservice teacher #4)

2/05/98 - 5:08 p.m. (5) For me, warm-ups have been far more than a class management tool, though that is certainly one important rationale for doing them. Though I'm not a math/science teacher, the cognitive need for review applies across the disciplines. If we momentarily put ourselves in the place of a middle school student bouncing from class to class day after day, cognitive reminders are useful as a way of easing them into your class and briefly reminding them of what the most recent objectives were. Since most math requires prerequisite understandings, it seems logical to use warm-ups as a way to review skills that will need to be remembered in order to do the next thing on your instructional "to do" list. So to my way of thinking, this "little strategy" that may take only a few minutes meets some pretty big cognitive and psychological needs of m.s. students, who must enter each class ready to tackle new objectives each day. This, then, is a perfect lead into the new objective, when you can say, "Do you remember doing this before, and, do you have any questions about this before we move on?" - after you've discussed a variety of students' answers, of course, or even had 1 or 2 of them come up and write out their solutions. As for ways to construct "review" warm-ups, there must be a million creative ways. In math, you might try an inductive method as opposed to deductive (you don't always have to be the one to come up with the problem - give them some data and ask them to make one up and solve it.) Then share. You could provide a model of a problem and solve for the answer concretely, but then ask for a more abstract response, such as a pictoral representation or a written, journal-type explanation. Or you could ask them to come up with another problem making use of the same operations. Heck, you could even ask the kids to figure

out a way to explain that particular mathematical concept to a blind person (that'll get them going!) I'll just end on that suggestion. (Supervisor #3)

2/05/98 - 11:23 p.m. (6) I love your final suggestion...tell a kid to figure out a way to explain a concept to a blind person. Did I ever tell any of you I taught a programming class in which there was a blind person? That was a challenge. He did great ... but I was constantly having to modify my "visual words!" Thanks for the thoughtful response...it got me thinking more about this topic. (Supervisor #2)

2/03/98 - 7:41 p.m. (7) Wow, I feel the exact same way. Supposedly the warm-up is designed to get them started before class and then when class does begin, you can go ahead and start class with going over the problem. But, in my class, it doesn't work that way. When the bell rings, I still have to go around and tell students to get their paper out and to begin. However, I just wanted to tell you that I like the idea of having two students go around and check the other's warm-up. I might try this to see if it motivates the students to get started early and try to be the first ones finished. They love to be teacher assistances and so I think they would love this to. I was just thinking that if you could use warm-ups that are more problem solving and get them to think in different ways, it may be more challenging and worthwhile. Of course now, you just have to find these problems. But good luck and thanks for the idea of the students walking around to check. (Preservice teacher #5)

2/03/98 - 9:52 p.m. (8) I think you're right when you question the types of problems in the "warm-ups." Even the metaphor "warm up" seems taken from the old belief that the brain is a muscle that must be exercised to keep it strong. (This belief was behind the notion that studying Latin was good for the brain and is an idea from the late 19th century, early 20th century.) Now we know that the brain is not a musclebut a network of biochemical, electrical connections. This suggests that lessons should begin with a focus activity or, as (Supervisor #2) said, an advance organizer. Focus activities activate prior knowledge (patterns of brain connections) and peak students' curiosity (motivate) and lead into the major concepts of the rest of the lesson or unit. Couldn't it be possible to use focus activities conceptually related to the lesson and at the same time have those problems serve as a class management tool to get students settled as they come in? Has anybody seen this done? (Supervisor #4)

2/04/98 - 7:35 p.m. (9) I understand your problem with the challenges. I do one or two everyday in my class. Sometimes they end up taking 30 minutes and then I only have 30 minutes to teach a difficult lesson. My teachers challenges often close to 45 minutes. The students love the challenge problems and so do I. However I do not know when to stop and give the answer.

Some students would not figure them out if they had the whole class period. I cannot let them last 30 minutes but often times they need this. If you come up with a solution, let me know. Thanks. (Preservice teacher #4)

2/05/98 - 7:14 p.m. (10) I guess I just want to wonder again what is the purpose of a warm-up. It seems that challenge problems do need to take some time ... so maybe this should be the focus of the class. I echo (Supervisor #3) about using these to lead into the lesson where possible. Or, as (Beginning teacher #5) noted, to provide practice for the EOG...then the use is short and to the point. It may be helpful to remind students what the purpose is so they know that timing is limited. Thanks, (Beginning teacher #4), for you clear statement about your process. I think it helps all of us. Maybe you want to talk with your CT about purposes of warm ups...may be even do some planning/talking together about choosing a warm up for each day over a week's time, really thinking about the goals for that choice. (Supervisor #2)

Figure 3: Relating Ideas from Methods Course

[Previous Main Topic]
Fran and Kevin or Ron Castleman? (1)
. . Re: Fran and Kevin or Ron Castleman? (2)
. . . . Re: Fran and Kevin or Ron Castleman? (3)
. . . . . Re: Fran and Kevin or Ron Castleman? (4)
. . . . . Re: Fran and Kevin or Ron Castleman? (5)
. . . . . Re: Fran and Kevin or Ron Castleman? (6)
. . . . . Re: Fran and Kevin or Ron Castleman? (7)
[Next Main Topic]

2/21/98- 9:04 p.m. (1) Most of you are getting to a point where you will be trying out your units...or you are designing special lessons in which you may be using some of the ideas we've talked about. For example, when I visited Lori U. recently, she was doing a lesson on angle measures using pattern blocks. It was a great lesson ... and she did some neat things. And what was interesting was some of the quick "processing" we did between two classes that came from her own reflections. I think she could tell you about it (how about it, Lori?) in some detail. It seems that there may be some Fran/Kevin or Ron Castleman like teaching events happening in your teaching these days. It would be a great if you would take the time to describe the situation...what happened...what kinds reflection you did about it...ask us any questions that might have occurred to you after the lesson(s) ... What do you all think? (PS...Lori W did a bit of this in her reflections about her use of the graphing calculators ...)

2/25/98 - 11:35 p.m. (2) Last week I did the lesson with pattern blocks that (Supervisor #2) mentioned. The first time I did it, I sort of explained what we would be doing and told them what I wanted them to try to figure out. Then I let them work in groups to do it. They were supposed to take the pattern blocks and figure out the measure of all of the angles of each piece without measuring it. They could only use their knowledge of the sum of the measures of the angles of triangles and quadrilaterals. They worked in pairs to do this. After about 30 minutes or so, I called them back together to go over some of their strategies. I called on a few students to give me answers and then I modeled them with overhead pattern blocks. Then I showed them another way that I had done it. I think this confused them, so after this class, I asked (Supervisor #2) if she had any suggestions for making the lesson better. She suggested that I ask them to tell me everything they know about triangles and quadrialaterals to launch the lesson. I did this and it helped me see what they did or didn't know and what I needed to remind them of before they began the activity. Then after they worked on finding the measures of the angles, I allowed the

students to come up to the overhead to explain and show their strategies for finding the angles. This seemed to go much better, and the students really enjoyed sharing their strategies. I think they also understood it pretty good from listening to each others strategies. The second time I did the lesson was much better than the first time!

2/26/98 - 8:54 p.m. (3) Thanks for describing this experience. I was wondering if any of you have had similar experiences where you have taught a lesson more than once and experimented with making modifications inbetween...and found out some things by doing so?

2/28/98 - 1:34 p.m. (4) I have two Pre-Algebra classes and I thought they were the same level. When I started teaching these two I found they are very diffeent with very very different needs. I always modify the lesson after I teach it once, therefor the second class goes so much better and the studens seem to get the material. The only problem is that I feel like I am causing trouble for the first class I teach. With this class I can see what I need to change and do differently. So, the second class goes great, but what do I do about the first class? ANy suggestions?

3/01/98 - 7:38 p.m. (5) I remember in Ron Castleman that he talked about trying to alternate...sometimes making one class first and then making another class first. That can happen serendipidously if you have an assembly or something like that...or, in the middle of you unit, you can deliberately not teach one class the lesson...do something related ... and then get them started the next day as the "second class." Just some thoughts.

3/2/98 - 4:08 p.m. (6) I am having a similar problem, except mine is all little different. Friday, I felt like my 4th period went very well, but my 7th and 8th did not. The difference was the kids! I had the lesson planned down to the nitty gritty and so my performance went well, but the kids responses were kind of lacking in quality. (except for 4th period). But today, my 4th period bombed and my 7th and 8th went like clockwork! I had not planned for the troubles this lesson was going to cause the class, and I did not know how to handle it in 4th. But, luckily I have lunch and planning in between, so I was able to reflect and talk to my CT who gave me great suggestions. So the last two classes went great -lucky for me since Supervisor #2 was observing me then! :) Anyway, I asked Supervisor #2 the same thing and she said that it was OK, since I would at least do better when I taught it again (like next year). And since I had reflected on how to teach it better, I could go back the next day and highlight points that I did not get to and do some examples with 4th period the way I did with the last classes. It might take a little time, but in the long run, it would definitely be worth it!

3/15/98 - 8:07 p.m. (7) Hi...there is no reason that the first class of the day always has to be the "new" lesson. You can teach out of order for a few days, i.e. start your new lesson in second period, revamp it for first period the next day...see you soon (Supervisor #1).

Table 5: Value of Discussion Forum

Six of the seven student teachers and three of the four beginning teachers were interviewed in March, 1998. All student teachers and beginning teachers completed an end-of-forum reaction sheet in May, 1998. Comments have been taken from these two sources.

Keeping in contact The good things are that I get to see how other people are doing. I mean, they are my friends so that is good, but at the same time see how other student teachers are getting along, seeing things that are happening to them. ... it gives me a chance to talk to the other student teachers that I would never see. A few of them are at school with me, but I never get to see them because they are at the other end of the school, and they are busy and I'm busy.	Support For the first year teachers, I guess the four of us, we have shared common experiences and basically, things that are going on in our class this year as far as how it differs from last year. Just some of the ideas that I have gotten from them as far as classroom management strategies are good. I felt that I was a teacher, but also a student in college, which is the kind of support I definitely needed as a first-year teacher. There is so much more to teaching than just doing student teaching, and I can't even begin to describe the differences. I mean it is just paper work, and you are totally responsible for everything that happens in that classroom. Yah, I think I share the same concerns with the three other first year teachers...
Isolation I'm in a school all by myself, so, there's no other interns there, so I feel very strange at times, and, it's a great way for me to, to keep in contact with the other ones. Certainly know that I'm not the only one out there. And that, um, if there are issues or concerns I can't bring up with my clinical teacher that they are there that I can talk to somebody. One important thing is that I knew there was a group of people I could talk to that understood what I was going through. They had been through it before or were going through the experience now. I knew I could write anything & feel comfortable b/c these people knew what I was experiencing. They also knew how to help me.	Isolation Just the fact that I'm still connected with the university. I feel like I'm seventy miles away, but I can still get on the internet and email you guys and get an immediate response and not having to write a letter or go over a different type of communication. I feel like in some ways I'm student teaching all over again because I'm still experimenting with a lot of things, and changing some things. There are still a lot of things that I would change for next year, like the way I would set it up from the very beginning.
Reflection You know, I, read what everybody else has written,	

and then apply that to what I'm doing also, if I haven't thought about it before, reading what they write makes me think about it. And so, just being able to, you know, reflect. I guess it motivates me more to reflect. And to see what I'm doing, as to compared with the other teachers.	

Others are in the "same boat" It is kind of reassuring sometimes to see that when I'm having a hard time I see that some similar things are happening to other student teachers, and we get advice from other student teachers, other first year teachers and/or the professors	
Immediate feedback Um, I think it's great because I get feedback right away. I don't have to write in a journal and wait for just one person to respond. I get a lot of different ideas from people who are in the same boat I'm in, from people who have already taught, and then from supervisors... I've gotten a lot of help, and if I'd written a journal, I would have gotten one person's opinion, but it would've been delayed. I couldn't have read the messages the same day.	
	Received good ideas I've actually taken some of the advice from the student teachers and used it in my classroom. I've even taken the advice of my first year teachers that I spent two years of my time with in college. I've used some of their advice. Also, it is good to kind of help talk out some situations and get feedback on how I handled it or how I could have handled it better.
	Value for student teachers The other things I've gotten from the student interns are questions on different types of situations and case studies, and [I] basically just reply to them. I haven't really done much of asking myself. I like it because I think that it is very helpful to the student teachers because they are the ones that have the majority of the questions, and I know that when I was still in my student teaching a lot of the questions that I was kind of afraid to ask my clinical teacher or Dr. XXX, it was kind of easier to ask people more my age, and more doing things that were related to me I wasn't so intimidated because I was afraid that if I asked my clinical teacher she might write that down or hold that against me...
	Being an "expert" I also appreciate getting to feel like the expert sometimes, and giving them advice. I think that that

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	not only helps me to kind of reflect on my own teaching, but it, it boosts my ego a little bit too.

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